



FCC Test Report

For:

Trackonomy Systems, Inc.

Brand:

Trackonomy

Marketing Name:

Multifunctional IoT Platform Wall-plug

Model Number:

PGW-2003

Product Description:

Multifunctional IoT Platform Wall-plug

FCC ID: 2AXA8-PGW-2003

Applied Rules and Standards:

47 CFR Part 15.247 (DTS)

REPORT #: EMC_TRACK_001_23001_FCC_15_247_LoRa_Rev1

DATE: 10/3/2023



A2LA Accredited

IC recognized #
3462B

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CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

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1 Assessment

The following equipment (as identified in section 3 of this test report) was evaluated against the applicable criteria specified in FCC rules Parts 15.247 of Title 47 of the Code of Federal Regulations.

According to section 5 of this report, the overall result is Pass.

Company	Description	Model #
Trackonomy Systems, Inc.	Multifunctional IoT Platform Wall-plug	PGW-2003

Responsible for Testing Laboratory:

Arndt Stoecker

2023-10-03

Compliance

(Director of Regulatory Services)

Date	Section	Name	Signature
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Responsible for the Report:

Art Thammanavarat

2023-10-03

Compliance

(Senior EMC Engineer)

Date	Section	Name	Signature
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The test results of this test report relate exclusively to the test item specified in Section 3.

CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
EMC Lab Manager:	Stoecker, Arndt
Responsible Project Leader:	Sivaraman, Sangeetha

2.2 Identification of the Client

Applicant's Name:	Trackonomy Systems, Inc.
Street Address:	214 Devcon Drive
City/Zip Code	San Jose, CA 95112
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as Client /-----
Manufacturers Address:	-----
City/Zip Code	-----
Country	-----

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Brand:	Trackonomy
Model No:	PGW-2003
Marketing name:	Multifunctional IoT Platform Wall-plug
FCC-ID :	2AXA8-PGW-2003
HW Version :	V2
SW Version :	V2
Product Description:	Data transmission for IoT platform
Frequency Range/number of channels:	❖ LoRa ○ Nominal band: 915 MHz ○ Center to center: 902 MHz – 928 MHz (ch 39)
Radio information:	❖ Lora: HopeRF RFM95CW-915S2 ○ FCC ID: 2ASEORFM95C
Max. Measured Conducted Output Power:	12.01 dBm
Power Supply/ Rated Operating Voltage Range:	100-240VAC/50-60Hz
Operating Temperature Range:	T min: -20 °C / T max: +60 °C
Other Radios included in the device:	❖ Bluetooth Low Energy: Murata Electronics North America MBN52832 ○ FCC ID: HSW2832 ○ BT LE V4.2 ○ Modulation: GFSK ○ PHY: 1M
Antenna Information as declared:	❖ LoRa antenna: Taoglas M/N: FXP14, gain: 3dBi, FPC antenna
Sample Revision:	☒ Production Unit; ☐ Pre-Production
Product dimensions [cm]:	127.3 L x 72 W x 46 H
Note: The information of the EUT specifications in the table above is provided by the applicant.	

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	10-080721-F12896	V2	V2	Conducted measurement
2	10-080721-F13016	V2	V2	Radiated measurement

3.3 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	Notes/Comments
N/A	-	-	-	-

3.4 Test Sample Configuration

EUT Set-up #	Combination of AE used for test setup	Comments
1	EUT # 1	The measurement equipment was connected to the 50-ohm RF port of the EUT.
2	EUT # 2	The internal antenna was connected.

3.5 Mode of Operation details

Mode of Operation	Description of Operating modes	Additional Information
Op. 1	LoRa	❖ An Android application on tablet provided by the client used to communicate with the device, that will not be available to the end-user to configure the LoRa to: • Maximum output power setting^{*1} • Maximum duty cycle • Modulated signal • Select TX channel: Mid 915 MHz
Op. 2	Idle	EUT in operating mode. Radios in standby mode.

3.6 Justification for Worst Case Mode of Operation

During the testing process, the EUT was tested with transmitter sets on the Middle channel and the highest possible duty cycle and output power.

For conducted measurements;

- All data in this report show the worst case of LoRa transmitting at the highest output power representing the worst case of LoRa transmission mode.
- All measurements were performed with a peak detector” and that the highest possible duty cycle was used for the testing.

For radiated measurements;

- All data in this report show the worst case of LoRa transmitting at the highest output power representing the worst case of LoRa transmission mode.
- All data in this report show the worst case between horizontal and vertical antenna polarizations and for all orientations of the EUT.

4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to assess the performance of the EUT according to the relevant requirements specified in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations.

This test report is to support a request for new equipment authorization under the following:

- FCC ID: 2AXA8-PGW-2003

4.1 Test procedures and standards applied

- FCC part 15, Subpart C §15.247
- KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10:2013

5 Measurement Results Summary

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	NA	NP	Result
§15.247(a)(1)	Emission Bandwidth	Nominal	-	☐	☐	☒	Note 1 Note 3
§15.247(e)	Power Spectral Density	Nominal	-	☐	☐	☒	Note 1 Note 4
§15.247(b)(3)	Maximum Conducted Output Power and EIRP	Nominal	Op.1	☒	☐	☐	Complies Note 2, 5
§15.247(d)	Band edge compliance Unrestricted Band Edges	Nominal	-	☐	☐	☒	Note 1 Note 6
§15.247; 15.209; 15.205	Band edge compliance Restricted Band Edges	Nominal	-	☐	☐	☒	Note 1 Note 6
§15.247(d); §15.209	TX Spurious emissions- Radiated	Nominal	Op.1	☒	☐	☐	Complies
§15.207(a)	AC Conducted Emissions	Nominal	Op.2	☒	☐	☐	Complies

Note 1: NA: Not Applicable; NP: Not Performed.

Note 2: Spot check for power level verification.

Note 3: Leveraged from report # S18121301101001, Section 7.3 (FCC ID: 2ASEORFM95C)

Note 4: Leveraged from report # S18121301101001, Section 7.5 (FCC ID: 2ASEORFM95C)

Note 5: Leveraged from report # S18121301101001, Section 7.4 (FCC ID: 2ASEORFM95C)

Note 6: Leveraged from report # S18121301101001, Section 7.6 (FCC ID: 2ASEORFM95C)

6 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with a 95% confidence interval (in dB delta to result), based on a coverage factor k=2.

Measurement System	EMC 1	EMC 2
Conducted emissions (mains port)	1.12 dB	0.46 dB
Radiated emissions		
(< 30 MHz)	3.66 dB	3.88 dB
(30 MHz – 1GHz)	3.17 dB	3.34 dB
(1 GHz – 3 GHz)	5.01 dB	4.45 dB
(>3 GHz)	4.0 dB	4.79 dB

RF conducted measurement ± 0.5 dB

According to TR 102 273, a multiplicative propagation of error is assumed for RF measurement systems. For this reason, the RMS method is applied to dB values and not to linear values as appropriate for additive propagation of error. Also used: <http://physics.nist.gov/cuu/Uncertainty/typeb.html>. The above calculated uncertainties apply to direct application of the Substitution method. The Substitution method is always used when the EUT comes closer than 3 dB to the limit.

6.1 Environmental Conditions During Testing:

The following environmental conditions were maintained during the course of testing:

- Ambient Temperature: 20-25° C
- Relative humidity: 40-60%

6.2 Dates of Testing:

8/8/2023 – 8/11/2023

6.3 Decision Rule:

Cetecom advanced follows ILAC G8:2019 chapter 4.2.1 (Simple Acceptance Rule).

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3. The measurement uncertainty is mentioned in this test report, See chapter 9, but is not taken into account – neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong.

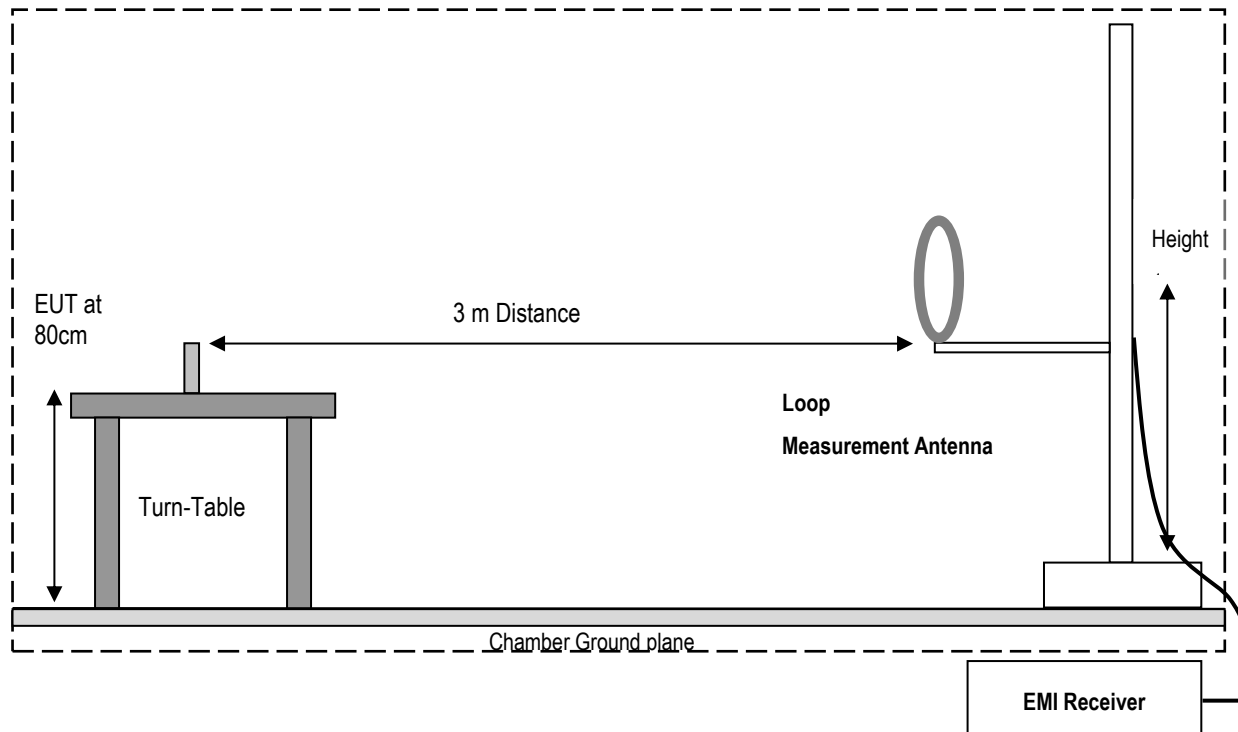
7 Measurement Procedures

7.1 Radiated Measurement

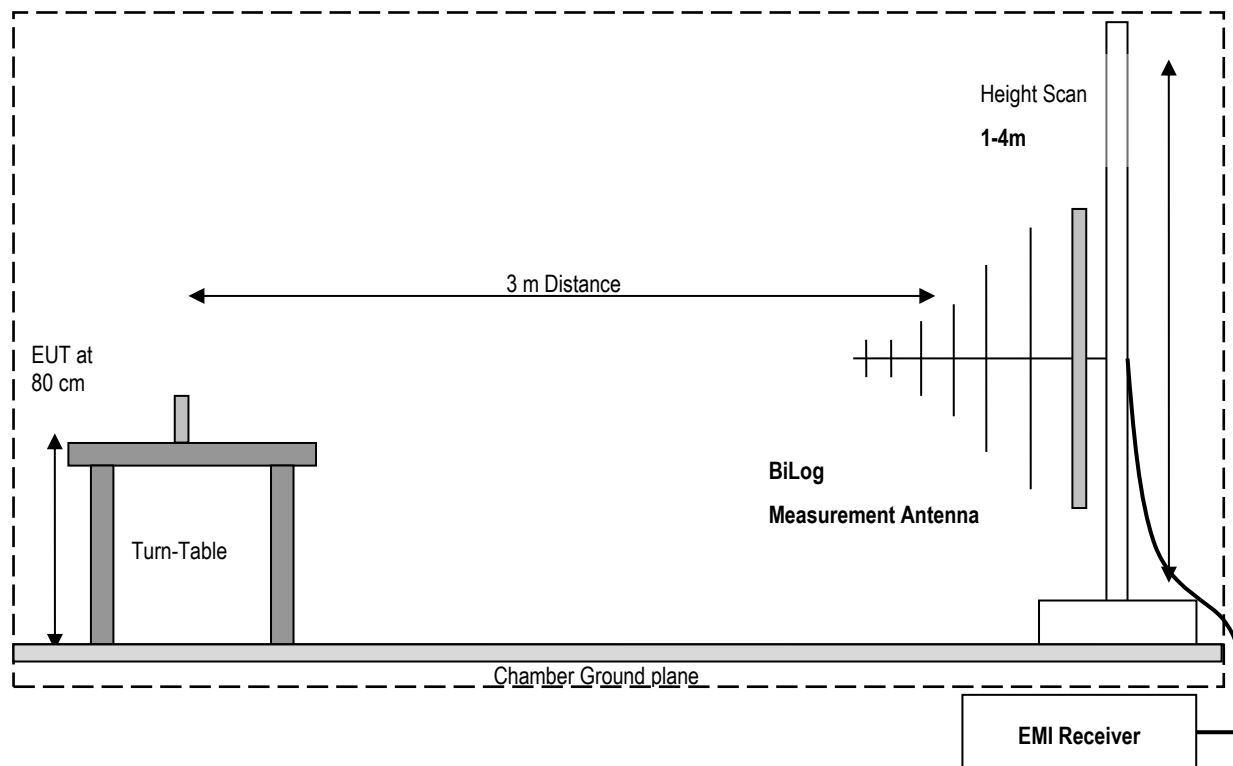
The radiated measurement is performed according to ANSI C63.10 (2013)

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 360° continuous measurement of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The highest six emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.

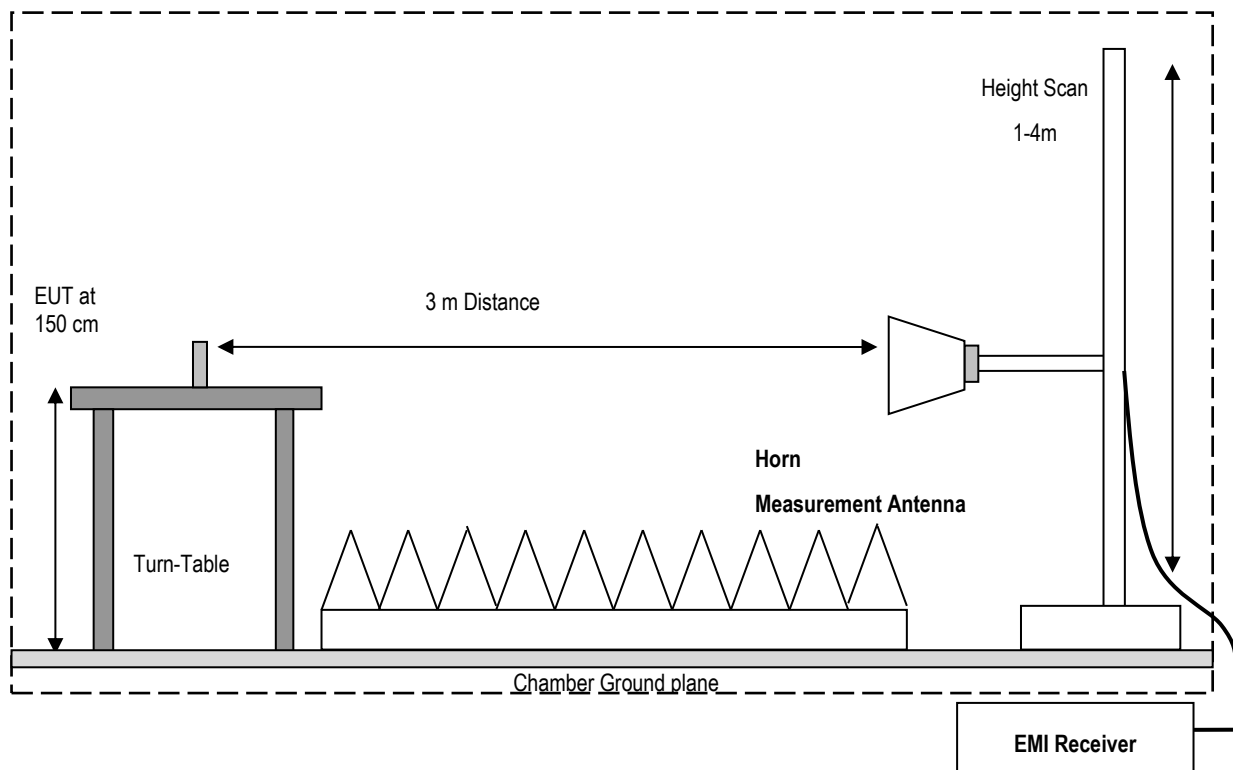
Radiated Emissions Test Setup below 30 MHz Measurements



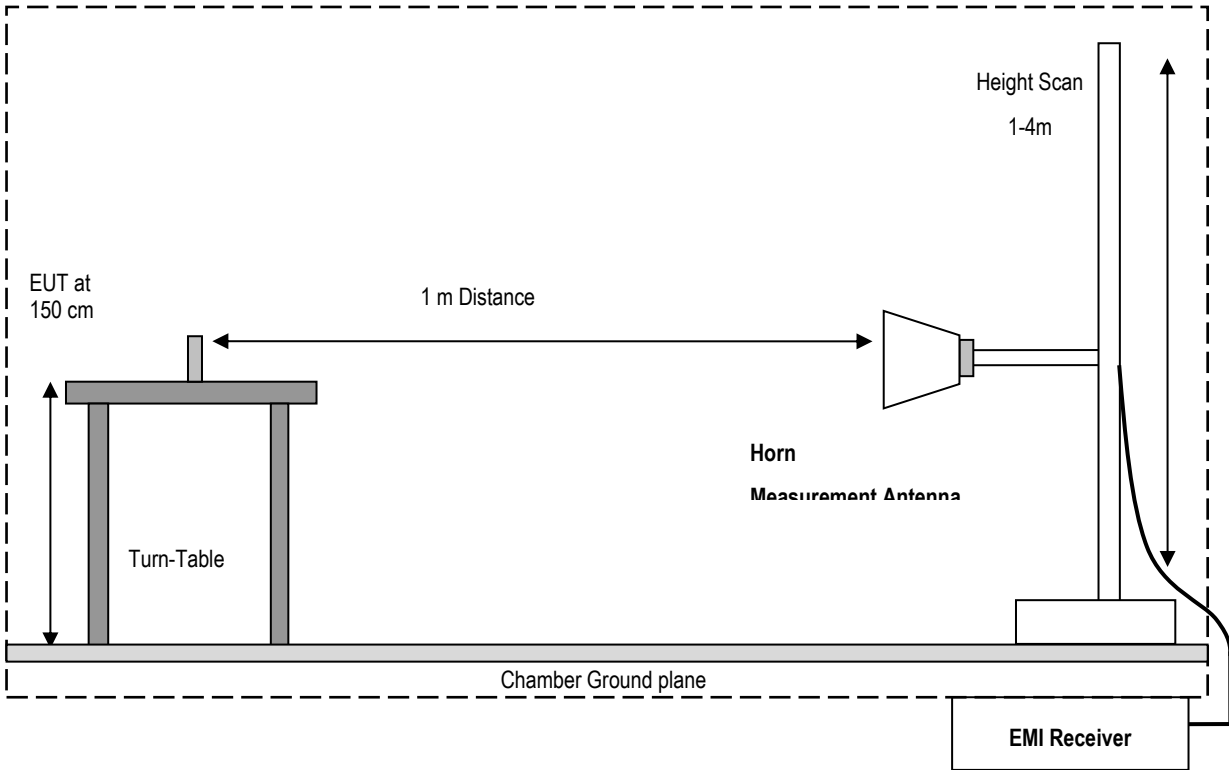
Radiated Emissions Test Setup 30 MHz-1 GHz Measurements



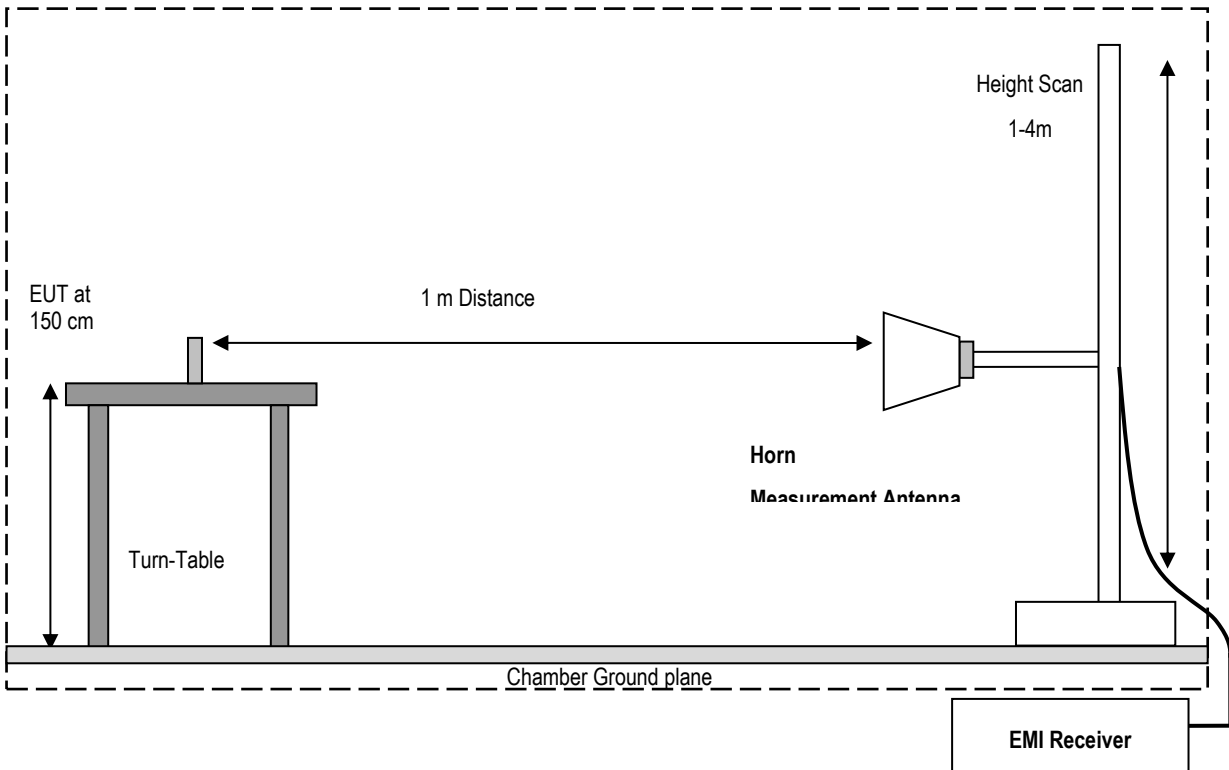
Radiated Emissions Test Setup above 1 GHz Measurements



Radiated Emissions Test Setup above 18 GHz Measurements



Radiated Emissions Test Setup above 18 GHz Measurements



7.1.1 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, taking into account the following parameters:

1. Measured reading in dB μ V
2. Cable Loss between the receiving antenna and SA in dB and
3. Antenna Factor in dB/m

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

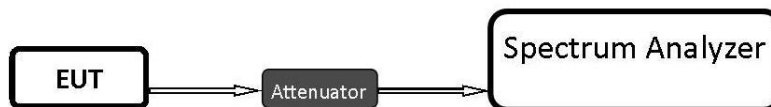
$$FS \text{ (dB}\mu\text{V/m)} = \text{Measured Value on SA (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

Example:

Frequency (MHz)	Measured SA (dB μ V)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dB μ V/m)
1000	80.5	3.5	14	98.0

7.2 RF Conducted Measurement Procedure

Testing procedures are based on 558074 D01 15.247 Meas Guidance v05r02 – “GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES” - April 2, 2019, by the Federal Communications Commission, Office of Engineering and Technology, Laboratory Division.



- Connect the equipment as shown in the above diagram.
- Adjust the settings of the SA (Rohde-Schwarz Spectrum Analyzer) to connect the EUT at the required mode of test.
- Measurements are to be performed with the EUT set to the middle channel and for worst case modulation schemes.

8 Test Result Data

8.1 Maximum conducted (Average) output power

8.1.1 Measurement according to ANSI C63.10 clause 11.9.9.2.2.4 RBW $\geq$ DTS bandwidth

Spectrum Analyzer settings:

- RBW = 1% to 5% of the OBW, not to exceed 1 MHz
- VBW $\geq 3 \times$ RBW
- Span = at least 1.5 times the OBW
- Sweep = Auto couple
- Detector function = RMS
- Trace = Average (at least 100 traces in power averaging (rms) mode)
- Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges
- Add $[10 \log (1 / D)]$, where D is the duty cycle, to the measured power to compute the average power during the actual transmission times

8.1.2 Limits:

FCC §15.247: (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

- (3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

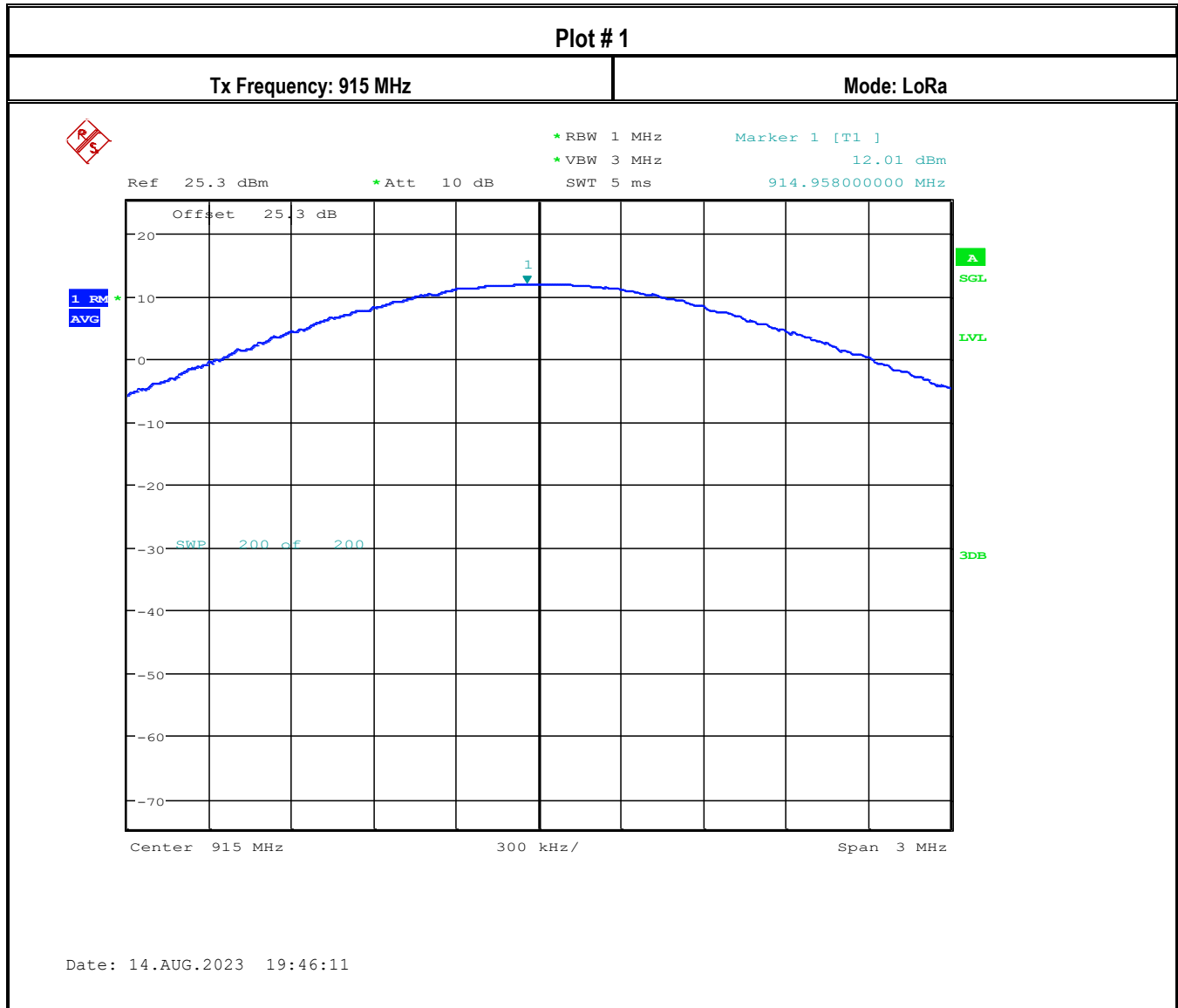
8.1.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23°C	1	Op.1	110V AC	3 dBi

8.1.4 Measurement result:

Plot #	Frequency (MHz)	Conducted output power (Watt / dBm)	Limit (Watt / dBm)	Result
1	915	0.016 / 12.01	1 / 30	Pass

8.1.5 Measurement Plots:



8.2 Radiated Transmitter Spurious Emissions and Restricted Bands

8.2.1 Measurement according to ANSI C63.10 (2013)

Spectrum Analyzer Settings:

- Frequency = 9 KHz – 30 MHz
- RBW = 9 KHz
- Detector: Peak
- Frequency = 30 MHz – 1 GHz
- Detector = Peak / Quasi-Peak
- RBW= 120 KHz (<1GHz)
- Frequency > 1 GHz
- Detector = Peak / Average
- RBW = 1 MHz
- Radiated spurious emissions shall be measured for the transmit frequencies, transmit power, and data rate for the lowest, middle and highest channel in each frequency band of operation and for the highest gain antenna for each antenna type, and using the appropriate parameters and test requirements.
- The highest (or worst-case) data rate shall be recorded for each measurement.
- For testing at distance other than the specified in the standard, the limit conversion is calculated by using 40 dB/decade extrapolation factor as follow: Conversion factor (CF) = $40 \log (D/d) = 40 \log (300\text{m} / 3\text{m}) = 80\text{dB}$

8.2.2 Limits:

FCC §15.247

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

FCC §15.209

- Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of emission (MHz)	Field strength (µV/m)	Measurement Distance (m)	Field strength @ 3m (dBµV/m)
0.009–0.490	2400/F(kHz) / -----	300	-
0.490–1.705	24000/F(kHz) / -----	30	-
1.705–30.0	30 / (29.5)	30	-
30–88	100	3	40 dBµV/m
88–216	150	3	43.5 dBµV/m
216–960	200	3	46 dBµV/m
Above 960	500	3	54 dBµV/m

FCC §15.205

- Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

- Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

*PEAK LIMIT= 74 dBμV/m

*AVG. LIMIT= 54 dBμV/m

8.2.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23°C	2	Op.1	110V AC	3 dBi

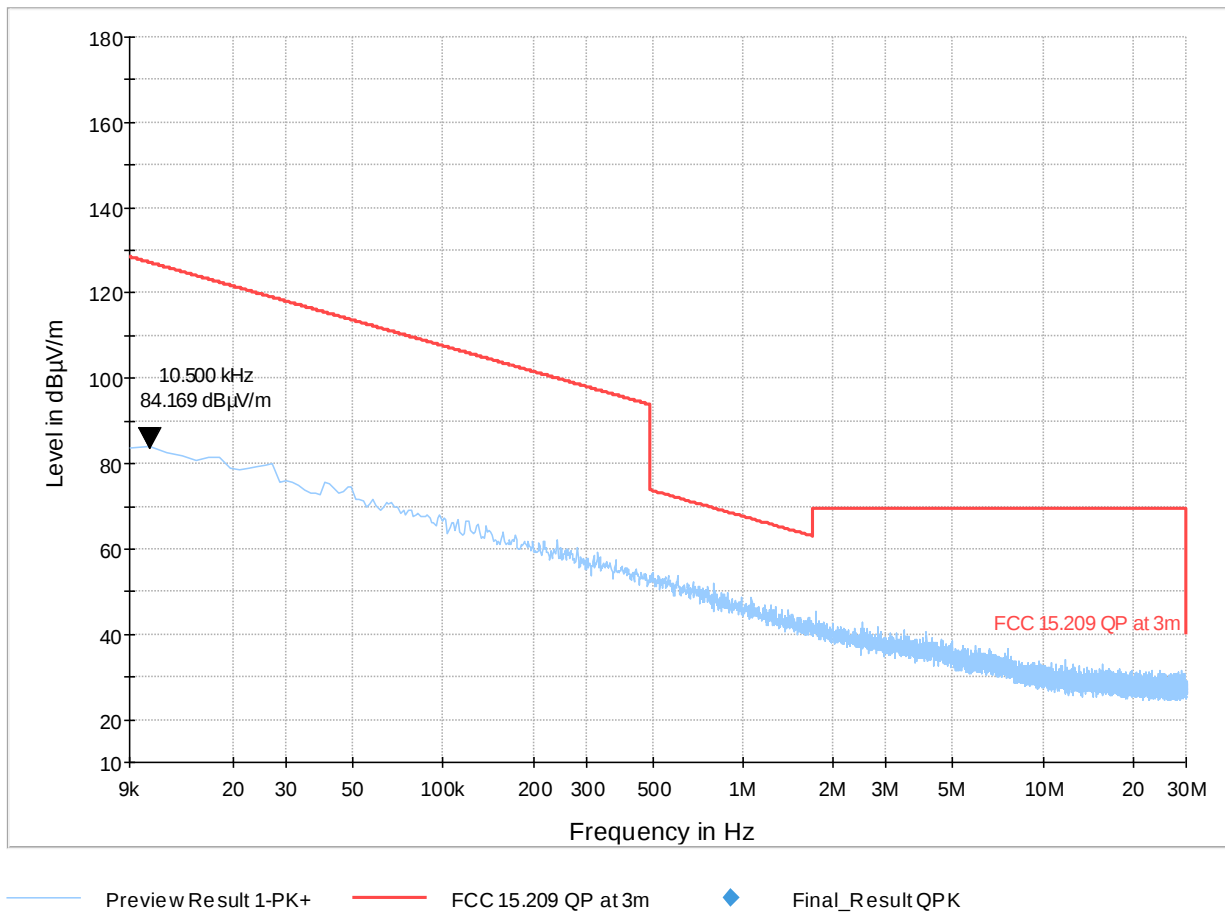
8.2.4 Measurement result:

EUT Set-Up #	Plot #	Channel #	Scan Frequency	Limit	Result
2	2 – 5	Mid	9 kHz – 18 GHz	See section 8.2.2	Pass

8.2.5 Measurement Plots:

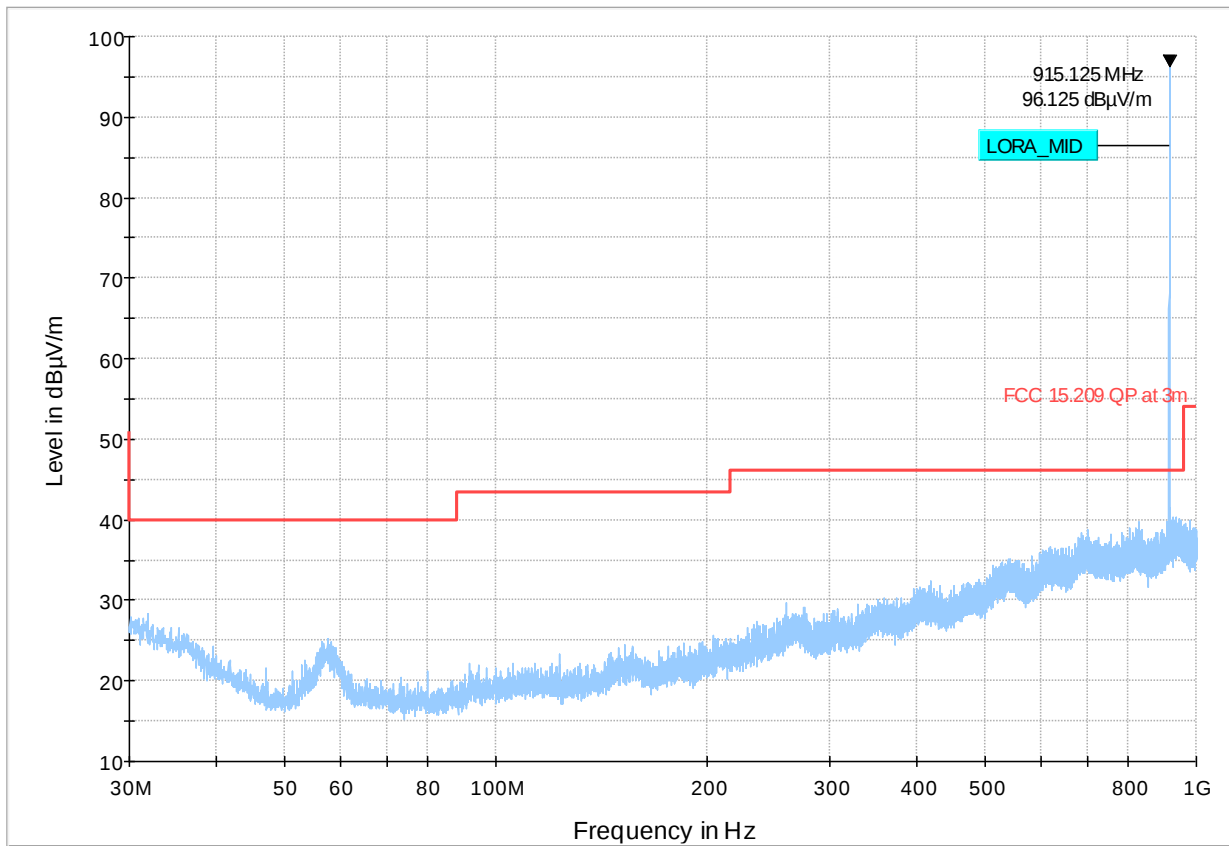
Plot # 2 Radiated Emissions: 9 KHz – 30 MHz

Tx Frequency: 915 MHz



Plot # 3 Radiated Emissions: 30 MHz – 1 GHz

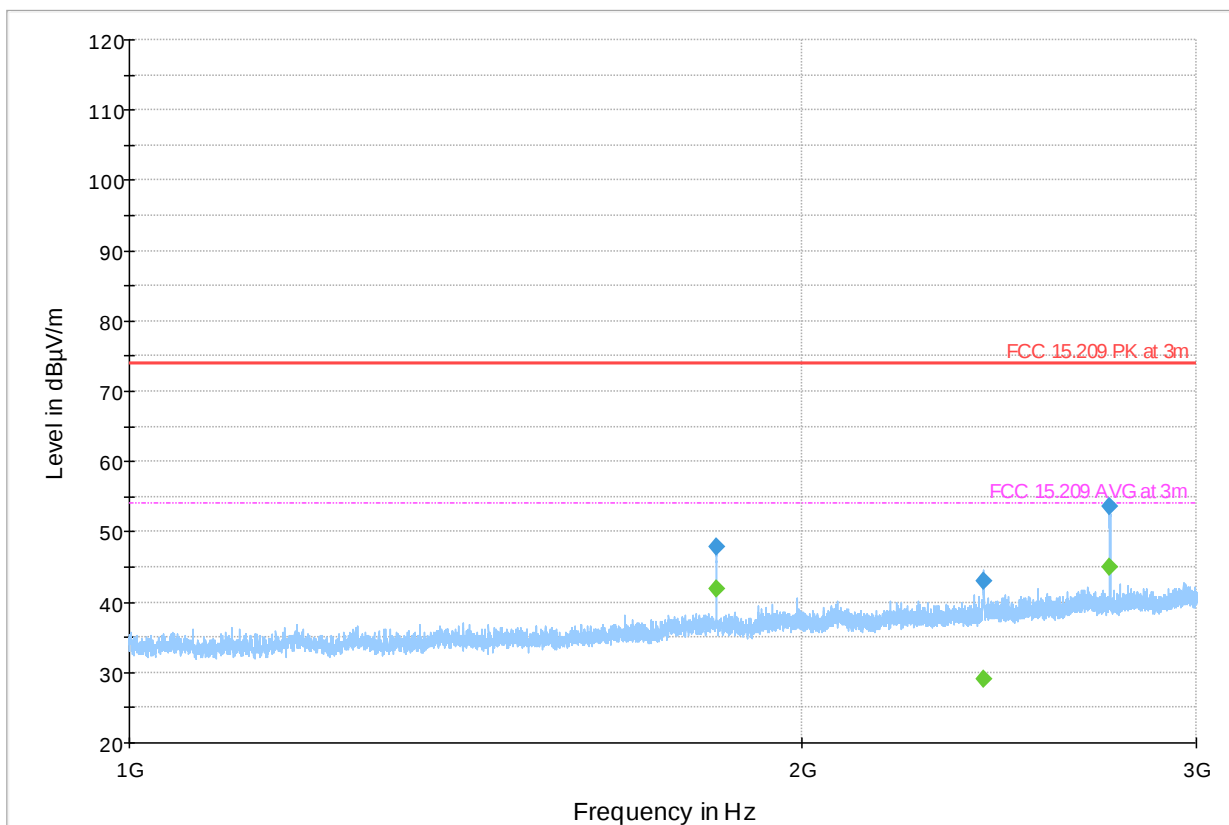
Tx Frequency: 915 MHz



— Preview Result 1-PK+ — FCC 15.209 QP at 3m ◆ Final_Result QPK

Plot # 4 Radiated Emissions: 1 – 3 GHz**Tx Frequency: 915 MHz**

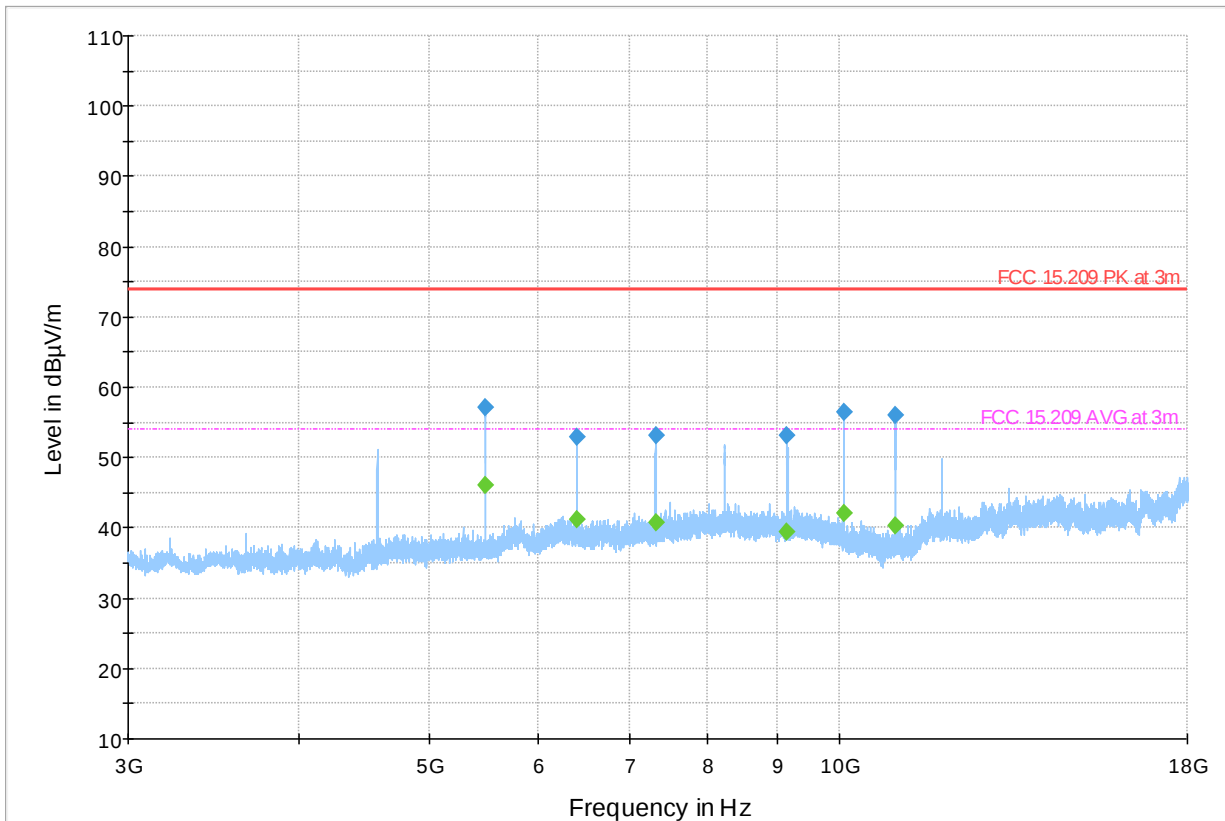
Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1830.143	47.847	---	73.98	26.13	500.0	1000.000	208.0	V	212.0	6.5
1830.143	---	41.876	53.98	12.10	500.0	1000.000	208.0	V	212.0	6.5
2410.429	---	29.076	53.98	24.90	500.0	1000.000	173.0	H	0.0	8.6
2410.429	43.106	---	73.98	30.87	500.0	1000.000	173.0	H	0.0	8.6
2744.429	53.629	---	73.98	20.35	500.0	1000.000	292.0	H	224.0	10.7
2744.429	---	44.985	53.98	8.99	500.0	1000.000	292.0	H	224.0	10.7



Preview Result 1-PK+ Final_Result PK+ FCC 15.209 PK at 3m Final_Result CAV FCC 15.209 AVG at 3m

Plot # 5 Radiated Emissions: 3 – 18 GHz**Tx Frequency: 915 MHz**

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5489.000	---	46.064	53.98	7.92	500.0	1000.000	150.0	H	206.0	-3.6
5489.000	57.176	---	73.98	16.80	500.0	1000.000	150.0	H	206.0	-3.6
6405.000	52.874	---	73.98	21.11	500.0	1000.000	150.0	V	132.0	-0.1
6405.000	---	41.167	53.98	12.81	500.0	1000.000	150.0	V	132.0	-0.1
7320.000	53.161	---	73.98	20.82	500.0	1000.000	150.0	H	229.0	0.7
7320.000	---	40.794	53.98	13.19	500.0	1000.000	150.0	H	229.0	0.7
9150.000	53.200	---	73.98	20.78	500.0	1000.000	149.0	V	195.0	1.8
9150.000	---	39.351	53.98	14.63	500.0	1000.000	149.0	V	195.0	1.8
10065.000	---	41.995	53.98	11.98	500.0	1000.000	149.0	V	209.0	0.8
10065.000	56.415	---	73.98	17.56	500.0	1000.000	149.0	V	209.0	0.8
10979.000	56.036	---	73.98	17.94	500.0	1000.000	149.0	V	192.0	-0.8
10979.000	---	40.363	53.98	13.62	500.0	1000.000	149.0	V	192.0	-0.8



Preview Result 1-PK+ FCC 15.209 PK at 3m FCC 15.209 AVG at 3m
Final_Result PK+ Final_Result CAV

8.3 AC Power Line Conducted Emissions

8.3.1 Measurement according to ANSI C63.4

Analyzer Settings

- RBW = 9 KHz (CISPR Bandwidth)
- Detector: Peak / Average for Pre-scan
- Quasi-Peak/Average for Final Measurements

8.3.2 Limits: §15.207

FCC §15.207(a)

- Except as shown in paragraphs (b) and (c) of this section of the CFR, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table (1), as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

8.3.3 Test conditions and setup:

Ambient Temperature ©	Power line (L1, L2, L3, N)	Power Input
23° C	Line & Neutral	110V / 60Hz

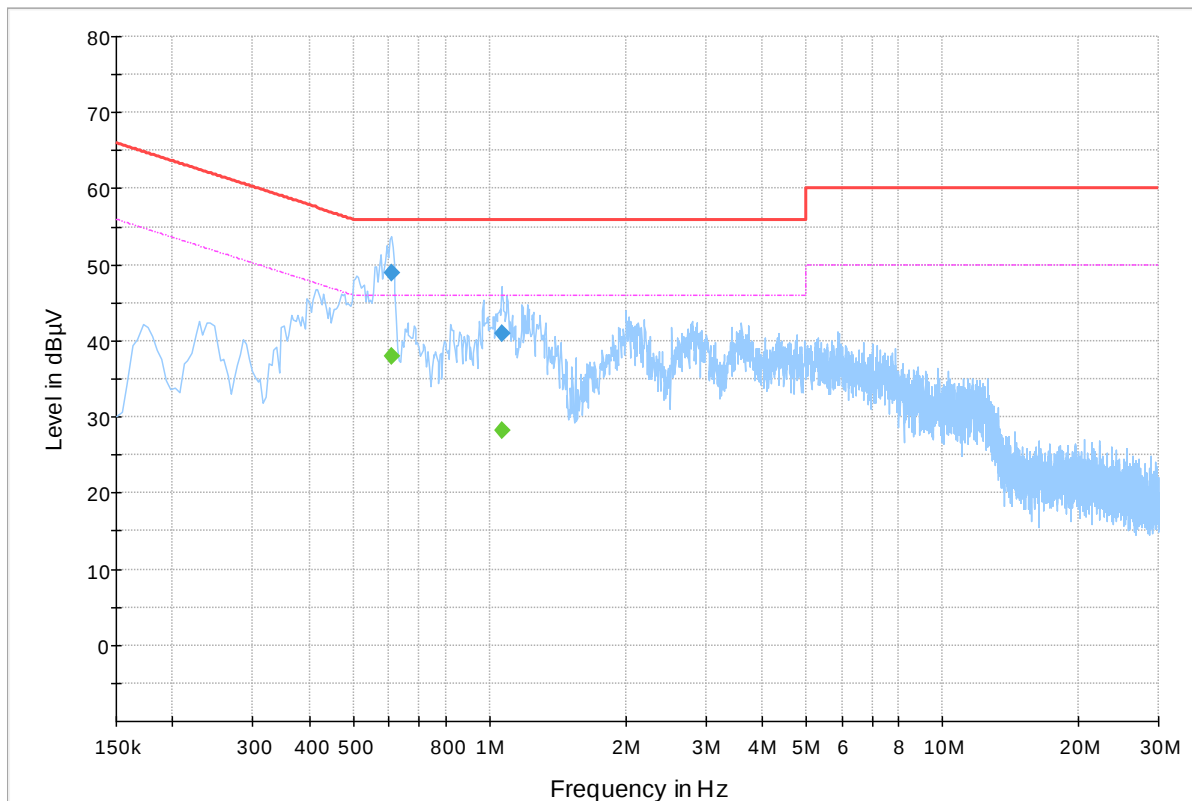
8.3.4 Measurement Result

Plot #	Port	EUT Set-Up #	EUT operating mode	Scan Frequency	Limit	Result
6	AC Mains	2	Op.2	150 kHz – 30 MHz	See section 8.3.2	Pass

8.3.5 Measurement Plots:

Plot # 6 AC Conducted Emissions: 150 kHz – 30 MHz**Final Result**

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.607	48.914	---	56.00	7.09	500.0	9.000	N	GND	10.0
0.607	---	38.054	46.00	7.95	500.0	9.000	N	GND	10.0
1.063	40.953	---	56.00	15.05	500.0	9.000	L1	GND	10.1
1.063	---	28.244	46.00	17.76	500.0	9.000	L1	GND	10.1



Preview Result 1-PK+
Final_Result QPK

EN 55032 Voltage on Mains QP
Final_Result CAV

EN 55032 Voltage on Mains AV

9 Test setup photos

Setup photos are included in supporting file name: "EMC_TRACK_001_23001_FCC_ISED_Setup_Photos.pdf"

10 Test Equipment And Ancillaries Used For Testing

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
ACTIVE LOOP ANTENNA	ETS LINDGREN	6507	00161344	3 YEARS	10/30/2020
BICONILOG ANTENNA	AH-Systems	SAS-521-2	569	3 YEARS	11/16/2021
HORN ANTENNA	ETS LINDGREN	3115	00035111	3 YEARS	9/30/2021
HORN ANTENNA	ETS LINDGREN	3117-PA	166067	3 YEARS	6/8/2022
HORN ANTENNA	ETS LINDGREN	3116C-PA	00169535	3 YEARS	9/23/2020
EMI RECEIVER	R&S	ESW44	101715	3 YEARS	4/12/2021
SPECTRUM ANALYZER	R&S	FSU26	200065	3 YEARS	8/25/2021
DIGITAL THERMOMETER	CONTROL COMPANY	36934-164	191871986	3 YEARS	10/20/2021
LISN	FCC	FCC-LISN-50-25-2-08	8014	3 YEARS	8/31/2021

Note: Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.

Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated "N/A" for cal status either do not specifically require calibration or are internally characterized before use.

11 History

Date	Report Name	Changes to report	Report prepared by
8/29/2023	EMC_TRACK_001_23001_FCC_15_247_LoRa	Initial Version	Art Thammanavarat
10/3/2023	EMC_TRACK_001_23001_FCC_15_247_LoRa_Rev1	<u>Report Revised.</u> 1. Section 5: Adding Note and Corrected Typo. 2. Section 8.1: Updated test method. 3. Updated 9kHz to 30MHz plot	Art Thammanavarat

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